DOCUMENT RESUME

ED 063 806 24 EM 010 164

AUTHOR Ihrke, Walter R.
TITLE A Study of the Present State of Electronic Music Training, Including Computer Assisted Instruction; A Bibliography. Final Report.
INSTITUTION Connecticut Univ., Storrs.
SPONS AGENCY National Center for Educational Research and Development (DHEW/OE), Washington, D.C.
BUREAU NO BR-0-A-071
PUB DATE Jun 72
GRANT OEG-1-71-0003(509)
NOTE 30p.

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS Computer Assisted Instruction; *Educational Technology; *Electromechanical Aids; Electronic Equipment; Musical Composition; Musical Instruments; *Music Education; Questionnaires; *Surveys

ABSTRACT

A questionnaire was sent to 276 member schools of the National Association of Schools of Music to gather information about the degree and extent of electronic technology used in music instruction. From the replies four types of electronic technology were identified: electronic piano studios, electronic music studios, computer-assisted music instruction, and modular training stations. Thirty music schools were visited. Schools in which electronic activity was well known were not visited, but a bibliography of published material documents their efforts. IT was found that schools visited were not availing themselves of the opportunities offered by these new technologies. Electronic music was confined to only its own area in the curriculum and had yet to make an impact on other courses. The investigator states that sooner or later educators must design a training rationale which incorporates electronics in training and electronic music in the tradition concepts and procedures. (JY)

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FINAL REPORT
Project No. 0-A-071
Grant No. OEG-1-71-0003 (509)

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Walter R. Ihrke
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Storrs, Connecticut
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June 1972

U. S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
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The research reported herein was performed pursuant to a grant with the Office of Education, U. S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

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PREFACE

The idea for this study grew out of a strong interest in the use of electronics in music training, which had culminated in 1969 with an experimental study in automated rhythm training. The earlier study was funded in part by the U. S. Office of Education, and can be found documented in ERIC under ED 032-790 with the title "An Experimental Study Of The Effectiveness And Validity Of An Automated Rhythm Training Program."

A large number of people have assisted in the present study, including the many administrators and educators who graciously agreed to a personal interview. A special word of appreciation is due Dr. Jack Heller and Thomas Vasil, both at The University of Connecticut, who served as consultants.

PART I. THE USE OF ELECTRONIC EQUIPMENT IN MUSIC TRAINING

Introduction

At the present time interest in educational technology is high, particularly in the use of various types of electronic hardware. Also general budgetary strictures are presently in effect which delay the growth and expansion of methods of utilizing these new devices. Therefore it is appropriate and timely to take stock of the situation by making a study of electronic activity in schools and colleges to determine strengths and weaknesses as they presently exist.

The information derived in this study can serve two purposes. It shows the extent and effectiveness of electronic activity in a broad cross section of schools in the country. It also attempts to provide general guidelines for initiating or expanding a program.

Visits were made over a period of five months from March to August, 1971 to a total of thirty schools widely distributed from coast to coast. Data was gathered by means of interviews with administrators and teachers, and by correspondence.

Design

A questionnaire (Appendix A) was sent to 276 member schools of the National Association of Schools of Music, and from the replies obtained it was possible to categorize the types of electronic activity. These types were:

1. Electronic piano studios.
2. Electronic music studios.
3. Computer use.
4. Modular training stations and others.

At the outset it was obvious that not all the schools that gave evidence of electronic activity could be visited. So the initial problem was to design a method of selecting visitation sites. The following outline shows the factors taken into consideration in the selection procedure.

1. Selection made from the membership schools of NASM.

2. Inclusion of schools that replied affirmatively to the questionnaire.

3. Distribution in four school categories: state universities, state colleges, denominational colleges, and private schools and colleges.

4. Omission of schools whose activity is well-known, in cases where information can be obtained from periodical and other publication sources.

5. Obtaining a cross section sample of activity.

6. Planning a practical itinerary in terms of auto travel.

The original plan submitted to HEW in the grant proposal categorized activity in terms of scope and depth according to this design listing from maximum to minimum activity:

1. In operation in the curriculum either as a regular catalogue course of instruction or as remedial training.

2. Being tested in training but not yet complete operational in the instructional program.

3. Being developed with a view toward experimental testing and eventual training use.

4. Experimental at present, with training as a definite objective.

5. Experimental only, without a definite training objective.

When the 230 responses to the questionnaire were returned, it was found that the information contained in these responses was too fragmentary to make it possible to use the above categorization. However it became very useful in making final evaluative statements which appear later in this report.

Of the 230 responses, 74 were in the affirmative. The visitation trip was based on a selection of 45 of these 74. Because of restrictions imposed by itinerary, appointment difficulties, and budget, this number was reduced to 30 actual visits. In spite of these restrictions it was possible to get a good cross section of schools in terms of activity type and school type.

Although the initial letter requested information about the work as well as printed or other prepared material, the response to this was very meagre. Thus the study had to rely almost entirely on results obtained by using an interview questionnaire (Appendix B). In the actual interview situations this questionnaire could not be used consistently enough to provide statistical data, and ultimately proved to be useful only as an interview guide. Frequently two or more members of a single college department gave conflicting information and the interviewer had to rely on more devious ways of obtaining information. For example, in one case the dean of a school of fine arts stated that there was no electronic music studio, when in fact one had been in existence for over a year with someone appointed to be in charge. But in spite of these problems enough information was gathered to give an accurate general picture in each of the activity areas. At first it was planned to evaluate each school in terms of extent and depth of the activity, but this was felt to be inadvisable in that it would tend to create a competitive picture. A portrayal of general trends was felt to be the most useful to the music teaching profession.

It should be noted that this report does not include data from a large number of schools in which electronic activity is an established part of the program. It was simply impossible to visit all of these schools. The material in this report is derived from data gathered from a special sampling of schools which are representative in the sense of being unknown for this activity, and have only recently made decisions to use electronic methods. The administrators of these schools can therefore provide information to others for making decisions of this type.

Electronic Piano Studios

There are presently two principal designs for electronic pianos; one uses the traditional piano strings to initiate the sound, and the other uses metal tone bars. Both are activated by striking with hammers in the traditional way. The principal advantage is that the sound can be picked up electrically and transmitted to the teacher or to other students by means of headsets with only slight interference or disturbance.

Advantages

1. A rich variety of unique training arrangments is possible. In a single room with six to sixteen pianos, it is possible to arrange groups of two, three, or more for ensemble playing, each group independent of other groups. The teacher can monitor any group at will.

2. Training in keyboard harmony is greatly facilitated. The studio can also be used in theory, conducting, counterpoint, and orchestration classes as a means of promoting the immediate use of the material as it is presented by the instructor.

3. Space saving. A single room of twelve pianos, classroom size, can replace twelve practice rooms.

4. A reduction of at least 50% in the number of teachers needed to teach secondary piano.

5. The use of taped material in a self-instructional format with a tape deck at each piano is very effective. In this way material can be presented to the entire group from a master console, or to individuals from each piano station. Once the material is prepared, a great deal of teacher time can be saved. This arrangement also provides for student self-pacing.

Disadvantages

1. Although the tone quality of the metal-bar piano is generally acceptable, there is room for improvement. Stringed pianos, traditional or electronic, although sounding the usual basic piano tone, differ greatly in tone quality. In this respect the tone-bar piano offers a more consistent tone quality.

2. Tuning is still a problem, even with metal bars. The total sound of a number of electronic pianos is still rather gruesome, but no more so than it is on traditional uprights.

3. There have been some attempts to provide a touch-controlled key action to duplicate the standard piano action, but this problem is not solved. There is some question of the necessity for duplicating the piano action since a reliable and consistent action of almost any kind would be superior to the present conglomerate actions.

The cost of an electronic piano is roughly the same as that of a good upright of traditional design. The cost of maintenance is also about the same, although an electronics service man should be readily available. Most schools already have such service available since electronic audio-visual materials are in wide use.

Electronic Music Studio

There is a rapidly burgeoning interest and activity in electronic music throughout the country. The trend is well-established and will undoubtedly become a permanent and significant element of the musical scene. Courses have been established, and in some cases a sequence of courses provide a modest curriculum for electronic music composition majors.

Although greatly dependent on factors such as amount and kind of equipment, school size, space availability, and experienced instructors, administrators tend to consider this a highly technical field requiring both musical experience and technical knowledge of the student participants. This trend runs counter to that found in secondary schools, where the student is immediately immersed in manipulation of the materials without a clear idea of what they are on what he wants to produce. The latter practice conforms to the established and valid educational philosophy of "learning by doing." This report makes no attempt to evaluate these two trends, but merely points out that they are exactly opposites.

There is considerable disagreement about restricting studio courses and experimentation to music majors. Some small schools open courses to the general student, believing that exposure to electronic sound manipulation is the most effective introduction to music materials. Large schools tend to restrict courses to music majors, and some to composition majors only after having had one or two standard composition courses.

Electronic music courses have a varied subject matter ranging from acoustics or physics of sound to equipment usage and eventually to composition itself. Some feel that the amount of acoustics and physics of sound material should be held to a minimum, and that emphasis should be put on understanding and skill in the use of equipment such as tape recorders, recording set-ups, and synthesizers. Others have developed single courses in each subject area. If a computer is involved, separate courses deal with digital-to-analog and analog-to-digital conversion techniques.

The equipment used in electronic studios varies greatly depending on budget and space resources. Some are set up in what are virtually garrets in otherwise splendid music buildings, while others are in quarters geared for a greatly expanded program. There has been a steady and rapid improvement in manufactured devices in terms of being designed directly for electronic music usage instead of needing to be converted from other uses. Some instructors prefer to teach fundamentals with simple equipment, with a few prefering patch cords to switch panels in order to highlight the connective features of the process.

It is impossible to give cost guidelines since this is entirely a matter of available funds; but fine work is being done with simple equipment. From a cost basis only, it would be unwise to repeatedly scrap available equipment which has as its only fault that it is outmoded.

There is no evidence whatsoever of attention being placed on the training of instructors in electronic studio work, and until this is remedied we will continue to have merely a scattering of course contents and curriculum configurations with no clearly stated objectives for electronic studio training. Electronic music is just now coming out of a period when the sheer novelty of these sounds produced an excitement and a flurry of activity of a randomly experimental nature. Hopefully, now that the vocabulary and syntax of this new music is forming, we can expect musical statements and compositions of a more substantial nature.

Computer Use

There was very little evidence of computer use in music in the limited number of schools visited, and few signs of interest. The literature on the subject (see bibliography) indicates that generally there is both interest and activity, but presently confined to schools where resources in space, equipment, and funds are adequate.

Since the computer is basically a data processing and storage device, certain types of musicological research lend themselves to computer assistance. Although great strides have been taken in certain localities in developing techniques and computer language for music, the complications in this process will delay wider acceptance, and a general attitude toward this as a musical way of life will be even further delayed. Certainly it will be a long time before this entire process gets out of the laboratory and becomes incorporated into a real training format.

Modular Training Stations and Others

Almost all schools have listening laboratories consisting of individual stations for the student. Headsets provide a means for hearing training material sent from a remote source, played from either a disc recording or tape. In some cases the student has no control or choice of material to be heard, while in other cases a dial access system provides more sophisticated communication possibilities. These have been generally successful, except that the more complicated the electronic system, the more important becomes the electronic servicing problem.

There have been a number of experiments in self-contained modular stations in which the opportunity for student response, material to be heard, and monitoring responses is rich enough to provide many procedural options for the student. One such project has been in continuous operation since 1965 and is used for remedial training in rhythm (see bibliography under 'Ihrke'). There is the possibility that a number of stations like this could be combined into a computer-assisted system, but at the present time little progress is being made in this direction.

Other one-student one-machine devices have been tried in experimental situations, but most have been discarded or neglected because of lack of interest or lack of funds.

Conclusions

The group of schools mentioned in this study are a cross section of the average situation in regard to electronic training. It must again be emphasized that schools in the top rank are making dramatic and effective progress, evidence of which can be found in the periodical literature listed in the bibliography.

Generally, schools in the visit group are not availing themselves of the opportunities offered by these new techniques, either by neglecting to use them in a wide variety of training formats or in expanding and modifying the teaching methods used.

Electronic music seems to be confined to only its own area in the curriculum, and has as yet made no impact on other courses. Theory

courses are not affected, ear training and sight singing courses are not changed, form and analysis courses are still contentedly counting cadences, key changes, and the number of returns of the main theme.

The investigator's questions as to how these courses and procedures might have to be modified were generally met with looks of consternation. But electronics in training and electronic music are here to stay, and sooner or later educators must design a training rationale which incorporates these with traditional concepts and procedures.

Chart A

Response to Questionnaire

Q. sent to	276	100%
Response from	230	83.3%
Responses	230	100%
No Activity	156	67.8%
Activity	74	32.2%
Activity	74	100%
Visits	30	41%

Chart B

Distribution of School Types

	Total	Visits	% Visited
Private	22	8	36%
Denominational	4	4	100%
State Universities	38	14	37%
State Colleges	10	4	40%
Total	74	30	40%

Chart C

Comparison of School Types
by Distribution of Activity*

(Totals)	Private 22		Denominational 4		State U. 38		State C. 10		(Mean)
Electronic Music	12	55%	3	75%	21	55%	7	70%	64%
Electronic Pianos	4	18%	1	25%	13	34%	1	10%	22%
Computer Use	2	9%	0	0%	3	8%	0	0%	4.5%

* Determined by correspondence and/or visits

Chart D

Comparison of School Types
by Depth of Activity*

	Private	Denominational	State U.	State C.
No. of visits	8	4	14	4
Electronic Music	4	2	4	-
Electronic Pianos	1	-	4	-
Computer Use	-	-	-	-

* On basis of special courses and effect upon other courses and curriculum

Chart E

Extent of Activity

Electronic Music

(74 Schools)	22 Private	4 Denominational	38 State U.	10 State C.
Studio in operation	12	3	21	7
Special courses	8	2	13	1
Open to Music Majors only	7	1	9	4
Open to all students	1	2	-	1
Effect on other courses and curricula	1	-	-	-

Electronic Piano Studio

(30 Schools Visited)	8	4	14	4
Studio	4	1	13	1
Class piano only	1	-	5	-
Theory class use	1	-	-	-
Music education class use	-	-	3	-
Used effectively	-	-	1	-
Used without modification of traditional methods	1	-	3	1

Computer Use

(30 Schools Visited)	8	4	14	4
General computer use	2	-	3	-
Experimental only	1	-	2	-
Used in training	-	-	-	-
Used in a catalogue course	-	-	-	-

Schools Visited

Private Schools (7)

Roosevelt University	-	Chicago
Northwestern University	-	Evanston
University of Miami	-	Coral Gables
George Peabody College	-	Nashville
American University	-	Washington
Temple University	-	Philadelphia
University of Denver	-	Denver

Denominational (4)

DePaul University	-	Chicago
University of Redlands	-	Redlands, Cal.
Heidelberg College	-	Tiffin, Ohio
Catholic University	-	Washington

State Universities (14)

Northern Illinois University	-	DeKalb
Ohio State University	-	Columbus
Bowling Green State University	-	Bowling Green, Ohio
University of Kentucky	-	Lexington
University of Florida	-	Gainesville
University of Southern Florida	-	Tampa
West Virginia University	-	Morgantown, W. Va.
McNeese State University	-	Lake Charles, La.
University of Texas	-	Austin
North Texas State University	-	Denton
University of California (UCLA)	-	Los Angeles
Oregon State University	-	Corvallis
University of Kansas	-	Lawrence
Wichita State University	-	Wichita, Kansas

State Colleges (4)

San Francisco State College	-	San Francisco
San Fernando State College	-	Northridge, Cal.
Sacramento State College	-	Sacramento, Cal.
Kansas State Teachers College	-	Emporia, Kansas

ELECTRONIC MUSIC TRAINING

Request for Information

I am planning a thorough study of the use of electronic music training devices including the use of a computer or other similar device, but excluding programs using only tape recorders or electronic pianos unless these are used in a system application.

During a sabbatical leave in Spring 1971, I will visit as many installations as possible, and eventually incorporate the results of information gathered in these visits and from other sources in a formal report.

If your school or department is engaged in electronic music training or in experimentation with that in view, please indicate this on this sheet in the spaces provided, and return in the enclosed envelope. I suggest you write a few descriptive comments if your reply is in the affirmative, and, if convenient, send material descriptive of the program and the operation. A later communication will then set an approximate interview date within the period from March 15, 1971 to June 25, 1971.

If your reply is negative, simply check in the proper place on this sheet.

Thank you for cooperating. I will appreciate an early reply.

Walter R. Ihrke
Music Department
University of Connecticut

- -

Return This Portion

Please check the appropriate spaces.

1. We are engaged in an experimental project or training program involving the use of a computer or other electronic device. _____
2. We have no activity of this kind. _____
3. We would welcome a visit from you. _____

Comments Name School Address

INTERVIEW QUESTION GUIDE

1. Computer-assisted, computer-managed, or other.
2. Completely experimental, under test in actual training, training program only, combined in a course, placed in the curriculum.
3. System or modular, description, conditions under which project is run.
4. If experimental only, what are plans for training use.
5. Plans for expansion into other areas.
6. Duration of project.
7. Terminal date of project.
8. Type of hardware used.
9. Type of software, how produced (printed, mimeo, ditto, published).
10. Program objectives.
11. Method of reaching objectives.
12. Degree of success in reaching objectives.
13. Type of student response.
14. Feedback delay.
15. Length of program; number of training items.
16. Musical quality of the program.
17. Quality of program sequencing.
18. Number of students in the program.
19. Student opinion.
20. Faculty opinion.
21. Role of the teacher.
22. Cost.
23. Suggested improvements.

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II. Electronic Music

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